

Tribhuvan University
Institute of Science and Technology
Model QuestionPaper

Bachelor Level/Third Year/Fifth Semester/Science

Full Marks: 60

Computer Science and Information Technology

Pass Marks: 24

(CSC 308 – Wireless Networking)

Time: 3 hours.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. List out the key points of wireless communication development. What are the challenges in wireless communication network?[3+3]
2. A GSM system operating at 900 MHz has operating power of 40 W. The transmitter and receiver gain are 5 dB each. By using free space path loss
 - (a) Express the transmission power in dBm.
 - (b) Calculate free space path loss between the BS and MS separated by 5 Km.
 - (c) Calculate received power.[3x2]
3. Define modulation. Explain about GMSK transmitter and receiver.[1+3+2]
4. Define diversity. Explain different diversity mechanism.[2+4]
5. Explain the concept of frequency reuse. In AMPS cellular system with 30 KHz channel BW, a S/I of 18dB is required for acceptable speech quality. By using path loss exponent of 4
 - (a) Calculate D/R.
 - (b) Calculate the cluster size or frequency reuse factor.[3+3]
6. Explain briefly about different techniques for capacity increase in cellular system.[6]
7. What is multiple access technique? Write briefly on TDMA with its advantage over FDMA.[1+5]
8. Describe the steps involved in setting up the call between the calling MSC and the called MSC with flow diagram.[6]
9. Write briefly on operation of mobile IP.[6]
10. Write short notes on [any two][2x3]
 - (a) Rayleigh fading
 - (b) QPSK
 - (c) MIPv4 vs. MIPv6
 - (d) Handoff management

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1. Define wireless communication. Compare first and second generation cellular system.[1+5]
2. A GSM system operating at 900 MHz needs a receiver sensitivity of 50 dBm at a distance of 500m from the transmitter. Transmitting antenna gain and receiving antenna gain are 10dB and 8dB respectively. At what power level the signal should be transmitted to satisfy the above condition? Use free space path loss model.[6]
3. Define modulation. Explain minimum shift keying (MSK) modulation technique.[1+5]
4. Why diversity is used in wireless communication? Explain different diversity mechanism.[1+5]
5. Define co-channel cell. Find the distance between the nearest co-channel cell in hexagonal topology with necessary diagram.[1+5]
6. Define adjacent channel interference. Explain how adjacent channel interference can be reduced.[2+4]
7. Explain frequency division multiple access technique.[6]
8. Define handoff. Explain briefly about different handoff strategies.[2+4]
9. Write briefly on operation of mobile IP.[6]
10. Write short notes on (any two)
 - (a) Near-far effect
 - (b) OFDM
 - (c) Aloha
 - (d) Mobile TCP hierarchy

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Attempt all questions.

1. What are the major challenges in wireless communication network? How can we combat those challenges? (3+3)
2. What are Doppler Effect and Doppler shift? Calculate Doppler shift for a person walking at a 3 km/hr in 900 MHz cellular system. (6)
3. Define modulation. Explain QPSK modulation technique.
4. Why channel equalization is used in wireless communication? Explain linear channel equalization. (1+5)
5. Define co-channel interference and adjacent channel interference. In a cellular system, the acceptable signal-to-cochannel interference ratio is 20dB. From the measurement the path loss exponent is found to be 4. What is the minimum cluster size? (2+4)
6. Explain briefly about different techniques for capacity increase in cellular system.
7. Explain time division multiple access technique. (3+3)
8. Describe the steps involved in setting up the call between MSC and the called MSC with flow diagram. (6)
9. Write short notes on MIPv6. Also mention the advantages over MIPv4. (6)
10. Write short notes on **(Any TWO)**: (2×3)
 - a) Fading
 - b) Probability of error of BPSK
 - c) Aloha
 - d) Call Admission Control (CAC)